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ABSTRACT

The effects of graphic preorganizers (structured overviews) and prereading vocabulary instruction upon literal (lower level) and inferential/evaluative (upper level) comprehension was studied, using six sections of college students enrolled in a developmental reading and study skills course. The class sections were randomly assigned to use either history or physical science content reading materials, with the sections randomly assigned to one of the three different treatments--structured overview prereading activity, vocabulary prereading activity, and no prereading activity. Posttest analysis showed that the structured overview groups had significantly higher total comprehension than the vocabulary and control groups. The structured overview treatment also improved students' upper and lower level comprehension scores. The vocabulary activity seemed to be more important in the teaching of science than in the teaching of history, perhaps because science is based so largely upon mastery of terminology. Regardless of the difficulty of the material, the structured overview was clearly an effective teaching strategy. (RL)

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THE EFFECTS OF THE STRUCTURED OVERVIEW AND VOCABULARY PRE-TEACHING UPON COMPREHENSION LEVELS OF COLLEGE FRESHMEN READING PHYSICAL SCIENCE AND HISTORY MATERIALS

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Recently graphic pre-organizers (structured overviews) and pre-reading vocabulary teaching have been cited with increasing regularity in methods textbooks as viable ways to help students organize material, terms, or concepts in their own minds, prior to reading content material (Herber, 1978; Estes & Vaughan, 1978; Tierney, Readence, Dishner, 1980). Moreover, a number of studies over the past few years have investigated the effect that these two pre-reading strategies have had upon student comprehension of various content texts (Barron, 1969, 1972; Barron & Cooper, 1973; Barron & Stone, 1974; Earle, 1969, 1973; Estes, Mills & Barron, 1969; Estes, 1972; Baker, 1977; Berget, 1977).

However, as Readence & Moore (1979) point out in their recent Integrative analysis of research on structured overviews, the results are far from conclusive, and much research concerning the validation of these techniques remains to be done. Also, it is important to note that although a number of studies have been conducted with students in grades

4-12, very little has been done to study the effects of advance organizers upon the content comprehension of college students. Bean (in press) discusses the effect of graphic pre-organizers on college freshmen's comprehension of science material and shows a positive effect of the organizers for mid-ability students, but much still remains to be investigated with college populations. Moreover, few investigators have yet attempted to examine the levels of comprehension affected by the use of advance organizer strategies.

Thus, the purpose of our present study is to examine the effect of graphic pre-organizers (structured overviews) and pre-reading vocabulary instruction upon the literal (lower level) and inferential/evaluative (upper level) comprehension of college freshmen when studying physical science and history material taken from freshmen level texts. In this study, only immediate recognition and recall will be measured.

Method

Procedures and Materials

Two content areas were selected for this study -- History and Physical Science. Reading selections were taken from texts in use at Western Illinois University during the Fall semester, 1979.^ Selections were matched as closely as possible by word count and readability. Both passages contained approximately 2,000 words and the average readability was approximately 11th grade for each selection, using the Fry formula. A 20-item test was designed for each content area selection and was used to test lower level and upper level comprehension immediately following the students'

reading of the selection. Each test consisted of 10 lower level comprehension questions (5 recognition and 5 recall) and 10 upper level comprehension questions (5 recognition and 5 recall).

Design

Six sections of Reading 199, a credit-bearing course in developmental reading and study skills taught at Western Illinois University, were randomly selected from among the nine sections taught during the Fall semester, 1979. Using a table of random numbers, 3 sections were assigned to the history selection and 3 sections to the physical science selection. Within each content area, each section was randomly assigned to one of the three different treatments (n = 22/section).

Description of Treatments

Treatment #1: Structured Overview Pre-reading Activity

Students were introduced to a structured overview illustrating the key concepts in the selection to be read. Each student was provided with a copy of the overview. ← Teaching time was controlled at 10 minutes and the overviews were collected before the selections to be read were distributed. Students were allowed 15 minutes to read the selection. After the selections were collected, 20 minutes were allowed to complete the test.

Treatment #2: Vocabulary Pre-reading Activity

Students were introduced to eight important vocabulary terms in the selection. A list of the eight terms was provided for each student. After the instructor

defined and commented on each term, the lists were collected. Teaching time was controlled at 10 minutes. Students were allowed 15 minutes to read the selection. After the selections were collected, 20 minutes were allowed to complete the test.

Treatment #3: No Pre-reading Activity

Students were allowed 15 minutes to read the selection. After the selections were collected, 20 minutes were allowed to complete each test.

Results

The descriptive statistics pertinent to the results of the study are found in Table 1

Put Table 1 about here

In order to get a clearer understanding of which posttest means were significantly different among the groups, the scores were analyzed via analysis of variance, followed by the Tukey HSD procedure. For Total Comprehension/Combined Content areas means the F ratio of 21.21 (2,129) was significant at the .05 level ($p<.0001$). History and science means were similarly analyzed for total comprehension. For History the F ratio of 10.46 (2, 63) was significant at the .05 level ($p< .0001$). For science the F ratio of 27.39 (2, 63) was significant at the .05 level ($p < .0001$).

A number of significant posthoc comparisons were found. For total comprehension for the combined content areas the structured overview mean was significantly higher than either the vocabulary or control mean. The vocabulary and control means were not significantly different. This same significance was found for each individual content area. For lower level comprehension for the combined content areas, the structured overview mean was significantly greater than either the vocabulary or control mean. The vocabulary and control means were not significantly different. When broken down by content area, this same significance was found for science. However, for history, the vocabulary mean was significantly lower than either the structured overview or control mean. There was no significant difference between the control and structured overview means. For upper level comprehension for the combined content areas, the structured overview mean was significantly higher than either the vocabulary or control mean. No significant difference was found between the vocabulary and control means. When broken down by content area, this same significance was found for history. For science, however, the structured overview mean was significantly higher than the vocabulary mean, and in turn the vocabulary mean was significantly higher than the control mean. For all comparisons between history and science, the science means were significantly greater than the history means.

Discussion

In this study, the structured overview positively affected students' upper and lower level comprehension scores as compared to either vocabulary

pre-teaching or control treatments. This study also indicated that pre-teaching vocabulary may be more important in the teaching of science than in the teaching of history, perhaps because science itself is so largely based upon mastery of terminology. It is possible that the students experienced more difficulty in reading the history material because of its higher or more unfamiliar concept load. Although an attempt was made to equate selection readability, the history selection may have been more difficult because of factors not measured by the Fry formula. However, regardless of the difficulty of the material, the structured overview was clearly an effective teaching strategy. Since a number of other studies do not show this marked significance in favor of the structured overview, results of this study should be interpreted with caution pending further research.

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Table 1

Means: Combined Content Areas, History, Science

Comprehension Levels	Combined Content Areas	History	Science
Total Comprehension			
Structured Overview	12.8	10.4	15.2
Vocabulary	9.1	7.0	11.3
Control	8.5	7.0	10.0
Lower Level Comprehension			
Structured Overview	6.5	5.5	7.6
Vocabulary	4.8	4.2	5.4
Control	5.1	4.7	5.6
Upper Level Comprehension			
Structured Overview	6.3	4.9	7.7
Vocabulary	4.4	2.8	5.9
Control	3.4	2.3	4.4